

GOSSYPIUM TURNERI (MALVACEAE),
A NEW SPECIES FROM SONORA, MEXICO

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In spite of extensive study of the genus *Gossypium* for more than 100 years, new species continue to be discovered and described, enlarging our understanding of this economically important and evolutionary interesting genus. Fryxell (1966) estimated that new species of *Gossypium* have been discovered and described in the first half of this century at an average rate of about one species every five years, excluding the excessive number of names that have been based on variants among the cultivated species (cf. Fryxell, 1976). The number of species described in recent decades has exceeded that rate (*G. lobatum* Gentry 1956, *G. longicalyx* Hutch & Lee 1958, *G. barbosanum* Phillips & Clement 1963, *G. nandewarensense* Derera 1964, *G. laxum* Phillips 1972, *G. pilosum* Fryxell 1974, *G. nelsonii* Fryxell 1974). The discovery of yet another species, described herein, suggests that the "age of discovery" even in this much-studied genus is not yet completed.

Gossypium turneri Fryxell, sp. nov. subsectionis *Caducibracteolatae*. Frutex circa 1 m altus, nigropunctatus; ramulis tomentulosis, foliis trilobis parvis 1.5–2.0 cm longis, petiolis laminis subaequantibus; pedunculis petiolos consociatos aequantibus vel excedentibus, articulatis bractea in nodo; bracteis involucellorum late rotundatis 3–7-laciniatis, per vel post anthesin caducis; calycibus subtruncatis, petalis luteis ad basem rubris, columna staminalis pallidis 16–17 mm longis, filamentis 5–6 mm longis; fructibus 3-cellularis manifeste glandularis; seminibus ignotis.

Shrub ca. 1 m tall. Twigs densely stellate-tomentulose, the radii ca. 0.1 mm long, only partially concealing the underlying gossypol glands; glands blackish, often somewhat raised, 0.1–0.2 mm diameter. Stems becoming woody, glabrate; bark red-brown with prominent lenticels 0.3–1 mm diameter. Leaf lamina cordate, shallowly trilobed, 1.5–2 cm long, slightly broader than long, the margin entire, at apex acute to obtuse, nearly glabrous above and below, palmately 5–7-veined, with prominent black gossypol glands scattered throughout lamina, these somewhat more abundant on margin. Foliar nectary single on the midrib beneath, 1–2 mm from base of lamina, ca. 1 mm long. Petiole stellate-tomentulose and glandular, 1.2–2 cm long. Stipules 1–4 mm long, linear, black-glandular, caducous. Peduncle axillary, solitary, ca. 2 cm long, equaling or exceeding subtending petiole, with pubescence like petioles, articulate at or above middle, bracteate at articulation, the bracts stipuliform, 1.5–4 mm

long, early caducous. Nectaries of involucler 3, prominent, more or less triangular, whorled at apex of pedicel. Bracts of involucler 3, inserted immediately above nectaries, prominently punctate, subglabrous, basally cuneate to truncate, broadly rounded proximally, 3-7-lacinate distally (rarely entire), in outline ovate, 9-16 mm long, 7-9 mm wide, the longest (central) tooth up to 7 mm long, the bracts caducous at or shortly after anthesis. Calyx 5-8 mm long, subtruncate with 5 inconspicuous teeth, prominently and uniformly glandular, subglabrous or with a few minute stellate hairs on margin. Petals 4-4.5 cm long, bright yellow with small red spot at base, black-glandular except toward base, ciliate on claw with hairs 1 mm long, densely and minutely stellate-pubescent externally where exposed in bud, otherwise glabrous. Staminal column glabrous, with a few black glands at base, pallid, 16-17 mm long, surmounted by 5 teeth, stamiferous in upper half; filaments pallid, 5-6 mm long; anthers one-celled, purplish, 1-2 mm long; pollen yellow-orange, spherical, echinate; anther mass ellipsoid. Style exceeding staminal column by 5-15 mm, prominently glandular, sparsely pubescent below; stigmatic surfaces densely pubescent, decurrent on style. Fruit a 3-celled capsule, 1-1.5 cm long, globose to ovoid, beaked, with long (2 mm) white hairs along suture margin after dehiscence but otherwise glabrous, with abundant and prominent black glands externally; carpel wall 0.5 mm thick. Seeds unknown.

TYPE: Mexico, Sonora, growing on windswept rocky outcrop near beach, western base of Tetas de Cabra (near San Carlos Bay), lat. 27.9°N, long. 111.1°W; elev. 5 m, 24 July 1977, R. M. Turner & D. E. Goldberg 77-49 (holotype: ARIZ; isotypes: CHAPA, MEXU, UC, pf).

Gossypium turneri finds a natural position in *Gossypium* subsection *Caducibracteolata* Mauer (Fryxell, 1969), which also includes *G. harknessii* Kellogg and *G. armourianum* Kearney. Phytogeographically the subsection maintains its integrity: *G. harknessii* and *G. armourianum* occur in the Baja California peninsula and on adjacent islands; the finding of *G. turneri* across the Gulf of California in Sonora constitutes only a minor extension of the range of the subsection.

Gossypium turneri shows its alliance with the other two species of subsection *Caducibracteolata* in the following characters: its caducous involucler bracts; its growth habit as a low shrub; its small, thick (xeromorphic) leaves; its large yellow corolla with a red center; and its small, 3-locular, prominently glanded capsule that flares widely at maturity.

It may be distinguished from the other two species of the subsection most easily by the lacinate involucler bracts (fig. 1), but differs also in several other characters, which are compared in Table 1. The color of the seed hairs distinguishes *G. armourianum* (brownish) from *G. harknessii* (whitish), but this character is as yet unknown for the new species.

The new species is named in honor of Raymond M. Turner, who first collected it.

TABLE 1. CHARACTERS DIFFERENTIATING THE THREE SPECIES OF GOSSYPIUM SUBSECTION CADUCIBRACTEOLATA.

Character	<i>G. armourianum</i>	<i>G. harknessii</i>	<i>G. turneri</i>
Leaf form	unlobed	lobed	lobed
Leaf glands (upper surface)	obscure	obscure	evident
Peduncle length (cm)	2-7	0.5-1.5	ca. 2
Peduncle articulation	with reduced petiolate leaf	bract absent (?)	with small stipuliform bracts
Involucellar bract:			
- shape	linear	lanceolate	ovate-lanceolate
- width (mm)	1-3	4-7	7-9
- stage of loss	in bud	anthesis	anthesis
Staminal column length (mm)	12-13	7-8	16-17
Filament length (mm)	3-4	2-3	5-6
Carpel wall thickness (mm)	0.6-0.8	1.5	0.5

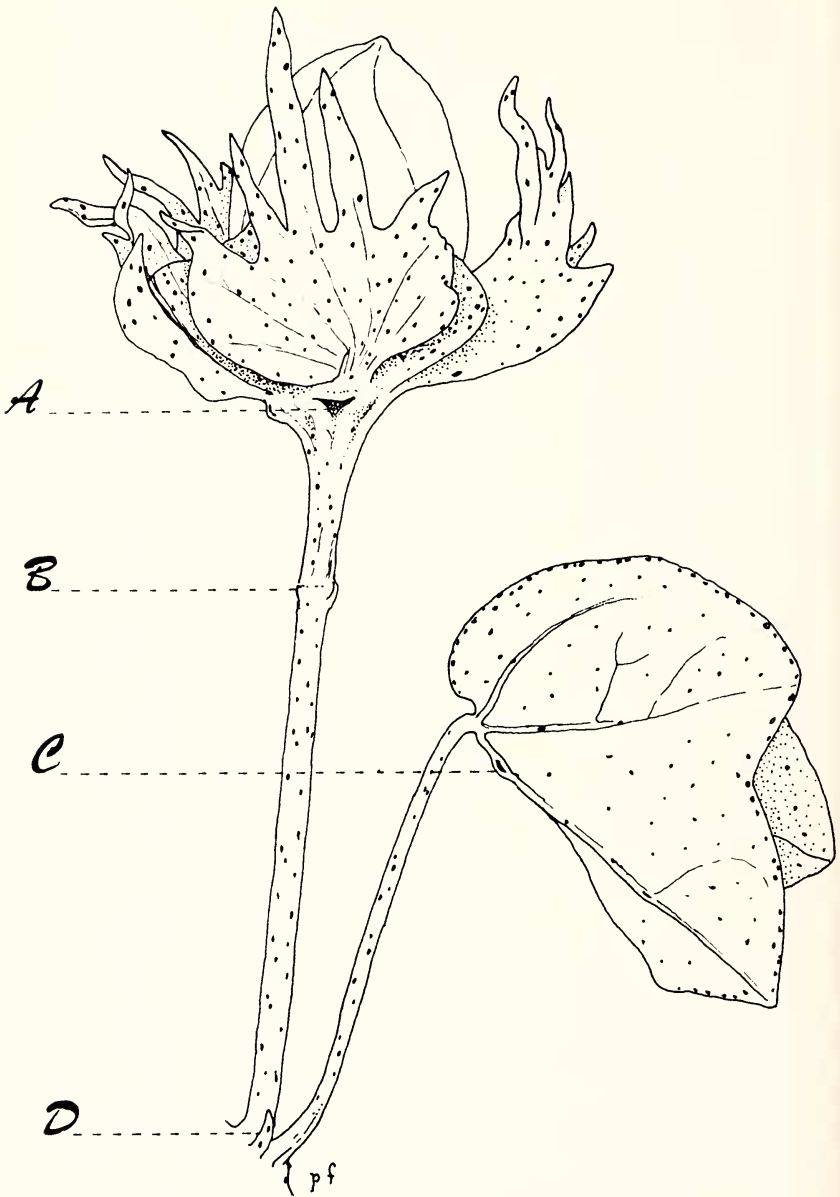


Fig. 1. Bud of *Gossypium turneri* with subtending leaf. A, involucellar nectary; B, articulation; C, foliar nectary; D, stipule. $\times 4$.

LITERATURE CITED

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NOTES AND NEWS

HEMIZONIA CONJUGENS (COMPOSITAE): DISTRIBUTION, CHROMOSOME NUMBER, AND RELATIONSHIPS — *Hemizonia conjugens* Keck (Aliso 4:101-109, 1958; type: River bottom land near Otay, San Diego County, California, *Abrams 3521*, UC!; isotypes, CAS!, POM!, NY) is a rare and poorly understood annual previously known only from southwestern San Diego County. Prior to this report this species was represented by only five other collections (*Abrams 3902*, *Stokes s.n.*, *Hall 3891*, *Hall 3916*, *Wolf 7969*) from near Otay Mesa, south of Chula Vista. Owing to the absence of this species from recent collections of the area, plus the extensive suburban and agricultural development of the area, thereby eliminating many natural habitats, it was considered possibly to be extinct. This area is fascinating as a result of its high degree of endemicity.

In May 1977, I was informed by Dr. Reid Moran of the San Diego Museum of Natural History that he had discovered a population that was apparently referable to the original description of *Hemizonia conjugens* (*Moran 24152: Tanowitz 1666*). The population was growing in mildly disturbed sandy loam, approximately 3 km SW of La Presa, Baja California (32°26'N 116°56'W). These plants were densely distributed over several acres. This represents a definite range extension for the species. Collections were made for morphological, cytological, and phytochemical studies; specimens will be distributed to various herbaria. A chromosome number, $n = 12$, is reported for this species for the first time.

Keck (*Munz, A California flora*, 1959; op. cit.) assigned *H. conjugens* to sect. *Deinandra* based upon its annual habit, sterile disk achenes, keeled phyllaries, and receptacular bracts of a single series surrounding the outermost series of disk florets. He considered *H. conjugens* to be most closely related to *H. fasciculata* T. & G. ($n = 12$; Johansen, 1933; Tanowitz, ined.) and *H. paniculata* ssp. *paniculata* A. Gray ($n = 12$; Johansen, 1933; Tanowitz, ined.). Based on morphological traits and geographical distribution, *H. conjugens* appeared to be intermediate to these species. Among the most significant of these of the former are the sterile and more or less glabrate disk achenes and among the most significant of the latter the number of ray and disk florets. They also show intermediacy in pubescence and distribution of pubescence and growth habit. Hence, Keck (op. cit.) postulated it to be an amphidiploid derivative of a hybrid between the two. This does not appear to be the case since the gametic chromosome number of *H. conjugens* is the same as the other two species: however, this evidence does suggest strongly that they are indeed related. Furthermore, preliminary flavonoid analyses of exudate aglycones display interesting patterns as well. Patuletin, quercetin, and two highly methylated flavonols are common to all three species. There is at least one flavonoid (methylated flavone) and one phenolic that is unique when compared to the other two.

The morphological, cytological, chemical, and geographical data strongly indicate that these three species are closely related and may have arisen either from the same ancestral stock or as a stabilized, diploid hybrid derivative of *Hemizonia paniculata* and *H. fasciculata*. Cytogenetical and more extensive chemical investigations are in progress to elucidate these speculations further.

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